

CASE 2006.PGG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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IN RE APPLICATION OF

GROUP ART UNIT: 1638

NAGLE, ET AL.

EXAMINER: DAVID T. FOX

S.N. 10/090,969

FILED: 06 MARCH 2002

FOR: GRAINPRODUCTION METHOD

FOR MAIZE STARCH WITH

NOVEL FUNCTIONALITY

Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

DECLARATION UNDER RULE 132

Sir:

I, Barry Nagle, a citizen of the United States currently reside at 1475 Sweet Saddle Ct, Carmel, Indiana declare as follows.

I am familiar with the issues raised in the above-identified patent application.

I graduated from Hobart College (Geneva, New York) with a Bachelor of Science degree in Biology/Chemistry and North Dakota State University with an M.S. and Ph.D in Plant Breeding and Genetics.

I have been a commercial maize breeder since 1981. I have developed dent, waxy and high amylose hybrids that have been grown commercially by grain producers in the United States and Europe.

I have been employed by National Starch and Chemical Company since 1999. I am the Director of the Plant Genetics Group. My work at National Starch has been directed towards employing genetics and plant breeding as a tool to develop novel starch functionality. My work has given me a strong background in the use of maize starch mutants in the development of new and useful starch functionality.

Combinations of two or more maize kernel mutant genes almost always result in reduced starch. The reduction in starch often eliminates the commercial potential of these genotypes due to very high cost. However, we have found that the reduction in starch can be overcome by developing genotypes where one of the mutant genes is in heterozygous form while the second is in homozygous form. The increase in starch is accompanied by a slight decrease in functionality, but improved commercial potential. Advantage has been taken of the fact that the maize kernel is triploid which allows the potential to add 1,2 or 3 copies of a given mutant gene.

The table in Example 3 of the above-identified application lists a series of kernel mutant genes that have been combined in one genotype. We have produced all of the resultant hybrids in this table. The double mutant waxy dull (wx1 du1) genotype known in the art produces very little starch in the homozygous recessive form. Using the methodology of the present application, we produced the waxy version with two copies of dull at our company research farm in Lebanon, Indiana. Quantities of starch approached normal commercially grown waxy maize. The functionality of the starch showed improved process tolerance compared to the waxy mutant.

Example 3 also lists a series of combinations involving the amylose extender gene (ae1). The ae1 gene produces high amylose maize starch. The addition of other genes in combination with the ae1 gene such as the sugary 2 gene (su2), and du1 was investigated to determine if novel properties could be discovered. Maize plants with homozygous ae1 and either heterozygous su2 or heterozygous du1 were grown on the National Starch Research Farm. In both instances the amount of starch in the grain exceeded the double homozygous mutant form.

In light of the above, I conclude that there is clear proof that the invention is operable as there is substantial seed set and the starch produced is useful.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by a fine or imprisonment or both under 1001 of Title 18 of the United States Code and such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Carmel, Indiana, this April 18, 2005.
location date

Barry Nagle
Dr. Barry Nagle